# ART. X. SOME UPPER DEVONIAN CRINOIDS FROM NEW YORK

By Winifred Goldring
New York State Museum

Through the courtesy of Mr. E. R. Eller of the Carnegie Museum, the writer has recently had the opportunity of studying a collection of crinoids obtained by him from the Lower Chemung beds in the creek bed at Alfred Station, Allegany County, New York. To the seventy-five feet of exposed shale, including the fossiliferous zone, Mr. Eller has given the name Alfred shale.

Six species are comprised in this collection, four belonging to the Flexibilia and two to the Inadunata. Among the Flexibilia one species is referred to *Eutaxocrinus pulcher* Springer and the other three are here described as new species of *Eutaxocrinus*. By far the larger part of the collection is composed of specimens of *Anamesocrinus lutheri* Goldring, many of them finer and better preserved than the types, so that it has been possible to emend and add to the original description. Another inadunate is represented by three poorly preserved and other partially preserved specimens that bear a strong resemblance to *Crematocrinus plumosus* Goldring from the Portage beds, but these specimens cannot be conclusively identified.

## Order **FLEXIBILIA** Zittel

### **Eutaxocrinus elleri** sp. nov.

(Plate XXII, figures 1-10)

This graceful species is represented by four adult specimens or parts of specimens, two young forms, and fragments of columns. Crown of medium size, spreading rapidly from the base to a greatest breadth above the fourth bifurcation where the arms begin to enroll. Height of average crown, the holotype, 31.5 mm.; greatest breadth 27.3 mm.; width at base 4.4 mm. Calyx much wider than high.

*Dorsal cup:* Infrabasals forming a low ring barely projecting beyond the enlarged column. Basals small, a typical one with a height



Issued August 12, 1935.

of 1.5 mm. and a width of 2.5 mm. Elongate posterior basal not shown. Radials comparatively large, an average one with a height of 3.4 mm. and a width of approximately 4.2 mm.; upper margin arcuate. Radials in young specimens proportionately larger.

*Tegmen* not preserved.

*Arms* bifurcating four times, divergent to about the fourth bifurcation where they become deeply incurved. Tips strongly enrolled. Above the secundibrachs the intervals between bifurcations are greater in outer divisions, and are particularly noticeable above the tertibrachs. Arms somewhat angular above the tertibrachs, strongly angular in the enrolled portion; well shown even on the secundibrachs in one of the young specimens. Secundibrachs two-thirds the width of the primibrachs, or less. In all succeeding bifurcations, the arms diminish in width about one-half, giving slender arms, particularly in the higher divisions.

Primibrachs two, wider than long, arcuate. All brachials above longer than wide, particularly in the higher divisions, and strongly arcuate. Secundibrachs 3 or 4 in the holotype; in two of the paratypes, one of them young, 4 or 5 are shown. Tertibrachs variable, fewer for the inner (4 or 5 usually; also 6) than for the outer divisions (6 to 9 usually; 4 in one). Quatribrachs variable, usually 7 or 9, sometimes 11 or more in the inner divisions; usually 11 in the outer divisions, less often more.

*Column* very characteristic. Proximal enlargement flush with the base of the calyx, composed of thin, strongly crenulated columnals, sharply set off from the rest of the column, tapering for 8.3 mm. in holotype from a width of 4.5 mm. at the base to a width of 2.7 mm. where the column changes character. In the holotype 52.5 mm. of column are preserved. Below the proximal enlargement the columnals soon take a definite pattern. Between slightly projecting and rounded nodals are three shorter columnals, one longer than the others and slightly projecting, the thinner ones with sharper edges. In the distal portion the projecting edges of these columnals, particularly the nodals, begin to grow sharper and show faint beading or tubercles.

Two young specimens have been referred to this species. The youngest preserves 14 cm. of column; the other 43 mm. The youngest specimen shows 4 mm. of thin columnals in the proximal enlargement, sharply set off from the rest of the column. For about 20 mm. the columnals show the same pattern as described for the holotype. Then

the projecting edges of the nodals, particularly, and the intermediate columnals as well, become beaded, a condition which becomes more and more pronounced distally until all columnals appear strongly tuberculated. The other young specimen shows 3.7 mm. of the proximal enlargement and the rest of the column is similar to the specimen just described, though it is not preserved for a sufficient length to show the striking tuberculated condition of the columnals. Separate sections of columns occur fairly abundantly in the shales in which occur the three species of *Eutaxocrinus* described here. They definitely do not have any relation to the other two species, but might well represent more distal portions of the column of *E. elleri* to which they are here referred. The arrangement of the columnals is that shown in the distal portion of the holotype and in the young specimen. The nodal columnals are strongly tuberculated, the middle one of the intermediate group more or less so, giving a very striking character to the column.

*Holotype and paratypes* in the Carnegie Museum, numbers 7229-7238.

*Remarks: Eutaxocrinus elleri*, with its strongly coiled angular arm-tips and characteristic column is readily distinguished from other species of the genus. The species was named in honor of the collector.

**Eutaxocrinus alfredi** sp. nov.

(Plate XXIII, figures 1, 2)

This species is represented by a specimen of medium size, the holotype, and a partially preserved crown provisionally referred here. The description is based largely upon the holotype. Crown broad, spreading immediately from the base where it is flush with the top columnal; height 35 mm., width at base 6.2 mm. Calyx about twice as wide as high. Surface smooth.

*Dorsal cup:* Infrabasals forming a very low ring about .8 mm. high in the holotype, 1 mm. high in the paratype. Basals small, with a height of 1.8 mm.; in the holotype one with a width of 3.7 mm., in the paratype 3.1 mm.; posterior basal not shown. Radials comparatively large; in the holotype an average one with a height of 3.1 mm. and a width of 4.6 mm., upper margin strongly arcuate; in the paratype height 3 mm., width 4.3 (?) mm.

*Tegmen* not preserved.

*Arms* bifurcating four times, divergent to the fourth bifurcation, or

just above, where they become slightly incurved in the holotype. In the paratype strongly incurved at the tips. Upper margins of all brachials strongly arcuate. Primibrachs two, wider than high; the first of about the same width but less high than the radials; primaxil wider but also less high. Secundibrachs 4 or 5 (3 in one ray of the paratype); wider than high, two-thirds the width of the primibrachs. In all succeeding bifurcations the arms diminish in width two-thirds, giving a robust appearance. All brachials wider than high. Tertibrachs 5 (inner) or 7 (outer); quatribrachs fewer in the inner division (9 to 12) than in the outer (16) in the holotype. Paratype shows 8 and 11 quatribrachs in inner divisions of different rays.

*Column* well preserved in the holotype, quite characteristic; stout, commencing flush with the base, with proximal enlargement. Enlargement composed of very thin columnals alternating in size, strongly crenulated; tapering gradually for about 12 mm., beyond which the column becomes cylindrical and the alternating columnals increase in length. Between the longest columnals, which may be regarded as nodals, are three thinner columnals, the middle the longest. Within a short distance extremely thin columnals appear between each two of these columnals and the three original intermediate plates increase in length, making every eighth plate the longest. This process of increase in length is repeated lower in the column making every sixteenth columnal the longest, the eighth columnal nearly as long, and every fourth columnal a long one with three intermediate ones as in the upper part of the column. Distal intercalated thin columnals fewer; less difference in size between nodals and other columnals. Nodals not prominent, flattened, projecting very slightly. All columnals crenulated.

*Holotype and paratype* in Carnegie Museum, numbers 7239-7240.

*Remarks:* This species differs from *E. pulcher* Springer in its broad-spreading crown and lack of pronounced infolding and in the character of the column. See remarks under *E. tenuiramosus* Goldring.

### **Eutaxocrinus tenuiramosus** sp. nov.

(Plate XXIII, figures 3-7)

A moderately large species represented by one mature specimen and two young. Crown broad, spreading rapidly above the primibrachs. Height of largest specimen more than 57 mm.; greatest breadth

more than 36 mm., breadth at base not estimated. Height of smallest crown 23 mm., width at base 2.2 mm. Calyx considerably wider than high; in the young specimen width nearly twice height. Surface smooth.

*Dorsal cup:* Infrabasals forming a low ring, only shown in one specimen, a mold. Basals small, shown only in the mold and the youngest specimen, an internal cast. In the specimen preserved as a mold (crown over 26.3 mm.), an average basal has a height of 1.3 mm. and a width of 2.2 mm.; in the smallest specimen a height of 1 mm. and a width of 1.3 mm. Elongate posterior basal (height and width 1.3 mm.) shown only in the smallest specimen. Radials crushed in the largest specimen; in the two smaller shown to be comparatively large, wider than high, with arcuate upper margin.

*Tegmen* not preserved. First of series of anal plates shown above the posterior basal.

*Arms* tapering rapidly above primibrachs and not infolding in that part preserved. Secundibrachs half, or slightly more than half, the width of the primibrachs, longer than wide; all brachials in divisions above about half the width (or less) of those of the preceding division, and all longer than wide. Upper margins of all brachials strongly arcuate; well shown in the mold. Above tertibrachs in the mold, the brachials are shown to be distinctly angular in the median line; tertibrachs somewhat angular in some divisions.

Primibrachs two, wider than high, smaller than the radials. Secundibrachs 3 or 4 in the two smaller specimens; usually 4, in one division 5, in the largest specimen. Number of brachials in ranks above varies; larger in the outer divisions. In the largest specimen, the tertibrachs number 7 for inner divisions, 9 for outer; quatribrachs 9 or 10 for inner divisions, 14 or 15 for the outer. In the mold, the tertibrachs number 5 for the inner divisions, 5, 6 or 7 for the outer; quatribrachs, 9 or 10? for the inner divisions, not accurately determinable for outer, 15? in one division. In the smallest specimen, tertibrachs number 5 for the inner divisions in two arms, 7 for the outer in one arm, 8 in another; quatribrachs, 10 for the inner divisions in two arms; 15 in one outer division with the others undeterminable.

*Column* preserved for 10 cm. in the largest specimen; with 6.2 mm. of proximal portion with the mold. Column commences flush with base, with a very slight proximal enlargement. Very thin, crenulated columnals, alternating in size for 6 or 7 mm. Below are distinct

nodals with a thin median projection separated by three shorter columnals, the middle one with a less prominent thin projection. Distal of this these three columnals become more prominent and have developed a beaded edge on the thin median projection, which is shown less distinctly on the nodals. Margins of all columnals strongly crenulate.

*Cotypes* in the Carnegie Museum, numbers 7241-7245.

*Remarks:* This species is readily distinguished from *E. alfredi* Goldring by the more slender arms (hence the name) with no apparent infolding and the longer brachials and the character of the column.

## Order **INADUNATA** Wachsmuth and Springer

### **Anamesocrinus lutheri** Goldring

(Plate XXIV, figures 1-9)

*Anamesocrinus lutheri* Goldring. N. Y. State Mus., Mem. XVI, pp. 324-326, pl. 40, figs. 6-9; text fig. 53, 1923.

The larger part of the collection from Alfred Station consists of specimens of *Anamesocrinus lutheri* Goldring, a number of them very well preserved and adding to our knowledge of the species.

This collection shows the species to be larger than supposed from material previously studied. The largest calyx studied has a width at the arms of 5 mm., and at the base of 2 mm. The arms of this specimen are incomplete, but the crown as preserved has a length of 22 mm. Another specimen with a slightly smaller calyx preserves the crown for a length of 37.3 mm., even then incomplete.

In the original description the arms were given as five to the ray, making a total of twenty-five arms. It was also noted that one of the smaller specimens (ref. cit., plate 40, figures 6, 7) seemed to have fewer arms on the compound radials. Careful study of the present collection shows that each radial bears five arms except the anterior which is narrower and has three. In two specimens the left anterolateral supraradial might at first be interpreted as bearing only three arms, but closer observation shows the radials in these rays to be incomplete. The species, therefore, has a total of twenty-three arms instead of twenty-five.

*Column:* Well preserved in a number of specimens. As pointed out in the original description the columnals gradually grow longer below

the enlarged proximal portion composed of very thin columnals until in the more distal portions of the stem they are three or more times the length of the proximal columnals. Distinct nodal columnals are also developed distally with three internodals between, the middle one often longer than the other two.

*Hypotypes* in the Carnegie Museum, numbers 7246-7254.

## EXPLANATION OF PLATE XXII

*Eutaxocrinus elleri* sp. nov.

FIG. 1. Mold of holotype, showing the character of the crown and column, × 1.

FIG. 2. The same with specimen replaced.

FIG. 3. Counterpart (× 1) of figure 2. Both views show the strongly enrolled arm extremities.

FIG. 4. The same with specimen replaced (× 1), counterpart of figure 1.

FIG. 5. A broken specimen (× 1) showing well the enrollment of the arms.

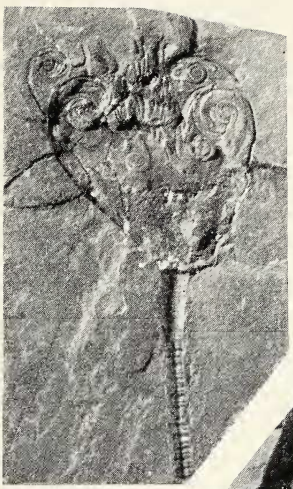
FIG. 6. Young specimen (× 1) with comparatively large radials and primibrachs. Proximal portion of column of the character of that shown in figure 7.

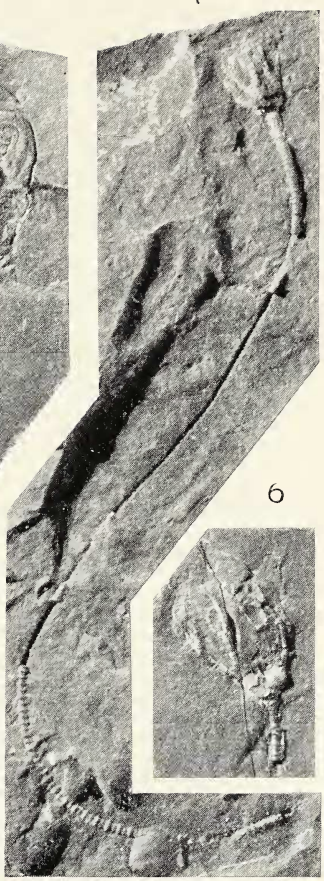
FIG. 7. Very young specimen, × 1. Proximal enlargement of column broken away, distal portion well shown.

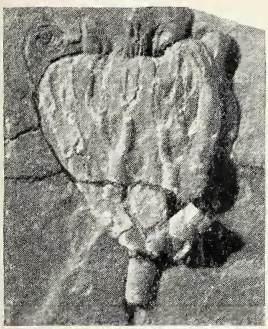
FIG. 8. Distal portion of column of same, × 2.

FIGS. 9, 10. Pieces of column referred to this species.


5


3


7

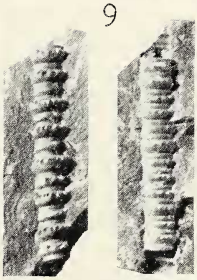

4


6


8


1


2


9

10

## EXPLANATION OF PLATE XXIII

*Eutaxocrinus alfredi* sp. nov.

FIG. 1. Holotype, × 1. The character of the arms and column is well shown.

FIG. 2. Partially preserved specimen showing the character of the radials and primibrachs and the proximal enlargement of the column. × 1.

*Eutaxocrinus tenuiramosus* sp. nov.

FIGS. 3, 4. Counterparts of largest specimen (× 1), showing the character of the crown and column.

FIG. 5. Mold of younger specimen (× 1) showing character of arms and lack of proximal enlargement of column.

FIG. 6. Plasticine "squeeze" of same.

FIG. 7. Young specimen from posterior side, × 2; showing character of arms and elongate posterior basal.